WHAT IS CLAIMED IS:

1. A solid phase for binding nucleic acids comprising:

a solid support portion comprising a matrix selected from silica, glass, insoluble synthetic polymers, and insoluble polysaccharides to which is attached on a surface;

a cleavable linker portion to the solid support portion, and

a nucleic acid binding portion for attracting and binding nucleic acids linked to the cleavable linker portion.

2. The solid phase of claim 1 wherein the nucleic acid binding portion is selected from a ternary sulfonium group of the formula $SR_2^+ X^-$ where R is selected from C_1-C_{20} alkyl, aralkyl and aryl groups, a quaternary ammonium group of the formula $NR_3^+ X^-$ wherein R is selected from C_4-C_{20} alkyl, aralkyl and aryl groups, and a quaternary phosphonium group $PR_3^+ X^-$ wherein R is selected from C_1-C_{20} alkyl, aralkyl and aryl groups, and wherein X is an anion.

3. The solid phase of claim 2 wherein the nucleic acid binding portion is a quaternary ammonium group and the R groups each contain from 4-20 carbon atoms.

4. The solid phase of claim 2 wherein the nucleic acid binding portion is a quaternary phosphonium group and the R groups each contain from 1-20 carbon atoms.

5. The solid phase of claim 4 wherein each R group is a butyl group.

6. The solid phase of claim 1 wherein the solid support portion comprises an insoluble synthetic polymer.

7. The solid phase of claim 1 wherein the solid support portion comprises a glass matrix.

8. The solid phase of claim 1 wherein the solid support portion comprises a silica matrix.

9. The solid phase of claim 1 wherein the cleavable linker portion further comprises one or more connecting portions.

10. The solid phase of claim 1 further comprising a magnetically responsive portion.

11. The solid phase of claim 1 wherein the cleavable linker portion is cleaved hydrolytically.

12. The solid phase of claim 11 wherein the hydrolytically cleavable linker portion is an ester or thioester group.

13. The solid phase of claim 1 wherein the cleavable linker portion is cleaved reductively.

14. The solid phase of claim 1 wherein the cleavable linker portion comprises a triggerable dioxetane ring.

15. The solid phase of claim 1 wherein the cleavable linker portion comprises an electron rich alkene which is cleaved by conversion to a thermally unstable dioxetane.

16. The solid phase of claim 1 wherein the cleavable linker portion is cleaved enzymatically.

17. The solid phase of claim 16 wherein the cleavable linker portion comprises an acridan ketene dithioacetal which is cleaved by reaction with a peroxidase and a peroxide.

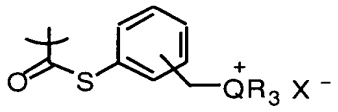
18. The solid phase of claim 16 wherein the cleavable linker portion comprises an ester which is cleaved by a hydrolase enzyme or an esterase enzyme.

19. The solid phase of claim 16 wherein the cleavable linker portion comprises an amide which is cleaved by a protease enzyme.

20. The solid phase of claim 16 wherein the cleavable linker portion comprises a peptide which is cleaved by a peptidase enzyme.

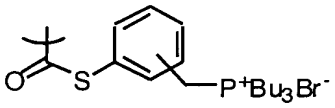
21. The solid phase of claim 16 wherein the cleavable linker portion comprises a glycoside which is cleaved by a glycosidase enzyme.

22. The solid phase of claim 12 wherein the cleavable linker portion comprises a thioester having the formula:



wherein Q is P or N and R is alkyl of 1-20 carbons.

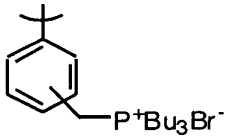
23. The solid phase of claim 22 wherein the cleavable linker portion comprises a thioester having the formula:



.

24. The solid phase of claim 1 wherein the cleavable linker portion is an alkylene group of at least one carbon atom bonded to a trialkylphosphonium or triarylphosphonium nucleic acid binding portion and is cleavable by means of a Wittig reaction with a ketone or aldehyde.

25. The solid phase of claim 24 wherein the cleavable linker portion has the formula



.

26. The solid phase of claim 2 wherein the nucleic acid binding portion of the solid phase is a ternary sulfonium group of the formula $SR_2^+ X^-$ where R is selected from C_1-C_{20} alkyl, aralkyl and aryl groups, and wherein X is an anion.